

The Genera *Megistostigma* Hook. f. and *Tragia* L. (Euphorbiaceae) in India

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Abstract

The genera *Megistostigma* Hook. f. and *Tragia* L. are revised for India. *Megistostigma* Hook. f. represented by *M. burmanicum* (Kurz) Airy Shaw is reported here as an addition to flora of India. The genus *Tragia* L. is represented by 7 species in India. Of these, *T. praetervisa* Chakrab. & N.P. Balakr. and *T. sanjappae* Chakrab. & N.P. Balakr. are described as new species. Dioecism has been found in both *T. montana* and *T. praetervisa*. *T. muelleriana* Pax & Hoffm. is a mixed assemblage. While its var. *unicolor* Pax & Hoffm. is shifted to *T. praetervisa* with a varietal status, var. *cordata* (Müll.Arg.) Pax & Hoffm. is united with *T. montana* (Thw.) Müll.Arg. and recognized as a distinct species. A new variety, var. *dioica* Chakrab. & N.P. Balakr., is described for *T. montana*.

Keywords: *Megistostigma*, New report, *Tragia*, New taxa, New combination, India

Introduction

The genus *Megistostigma* Hook. f. is closely related to *Cnesmone* Blume, differing in lack of deflexed apical appendage of anthers, thickening and fusion of styles into a large subglobose mass and having six female sepals instead of three. The genus is represented by five species, distributed from China and Myanmar to Borneo and the Philippines. This paper records its occurrence in Nagaland, India. Airy Shaw (1969) has provided keys to all the species of the genus.

The genus *Tragia* L. consists of about 170 species, mainly occurring in Africa, Madagascar and the Americas, but also extending across Asia to Australia (absent in China, SE. Asia and Malesia). The diversity in the genus is evident from Müller's (1866) division of the genus into 12 sections. Pax and Hoffmann (1919) treated 123 species under nine sections. Of these, the Indian species are placed under the section *Tagira* Müll. Arg. characterized by pinnatifid female sepals and usually three free to almost free stamens. In the present treatment, seven species are recognized in India, of which two are described as new.

As per the recent classification of the family Euphorbiaceae (Webster, 1994), the genera *Megistostigma* and *Tragia* are placed under the

subfamily Acalyphoideae Asch., tribe Plukenetieae (Benth.) Hutch.

Systematic treatment

Megistostigma Hook. f.

in Hooker's Icon. Pl. 16: t. 1592. 1887 & Fl. Brit. India 5: 467. 1888; Airy Shaw, Kew Bull. 23: 119. 1969 & 36: 330. 1981.

Type: *M. malaccense* Hook. f.

Clavistylus J.J. Sm., in Koord. & Valetton in Meded. Dep. Landbouw, 10: 517. 1910.

Type: *C. peltatum* J.J. Sm.

Slender woody climbers with twining stems and stinging hairs. Leaves alternate, petiolate, trinerved at base; stipules conspicuous. Inflorescence terminal or leaf-opposed, racemose, bisexual, pedunculate, with 1 female flower at proximal node and several to many male flowers at distal nodes, bracteate. Male flowers: sepals 3, valvate, shortly connate at base; petals absent; disc trigonous-annular; stamens 3, free, alternating with calyx lobes; filaments short, thick;

anthers bilocular; thecae divergent, attached to the base of thickened connective, dehiscing laterally and longitudinally; connective shortly produced at apex. *Female flowers*: sepals 3 + 3, imbricate; petals and disc absent; ovary 3-loculed, 3-lobed; locules 1-ovuled; styles thickened and united into a large subglobose mass. *Fruits* capsular, depressed, tricocous, consisting of 3 bivalved woody cocci; seeds globose; testa mottled; albumen fleshy; cotyledons broad, flat.

Megistostigma burmanicum (Kurz) Airy Shaw, Kew Bull. 23: 119. 1969.

Tragia burmanica Kurz, J. Asiat. Soc. Bengal, Pt. 2. Nat. Hist. 42(2): 244. 1873 & For. Fl. Brit. Burma 2: 398. 1877; Hook. f., Fl. Brit. India 5: 466. 1888; Pax & Hoffm. in Engler, Pflanzenr. IV. 147. ix (heft 68): 99. 1919. **Fig. 1**

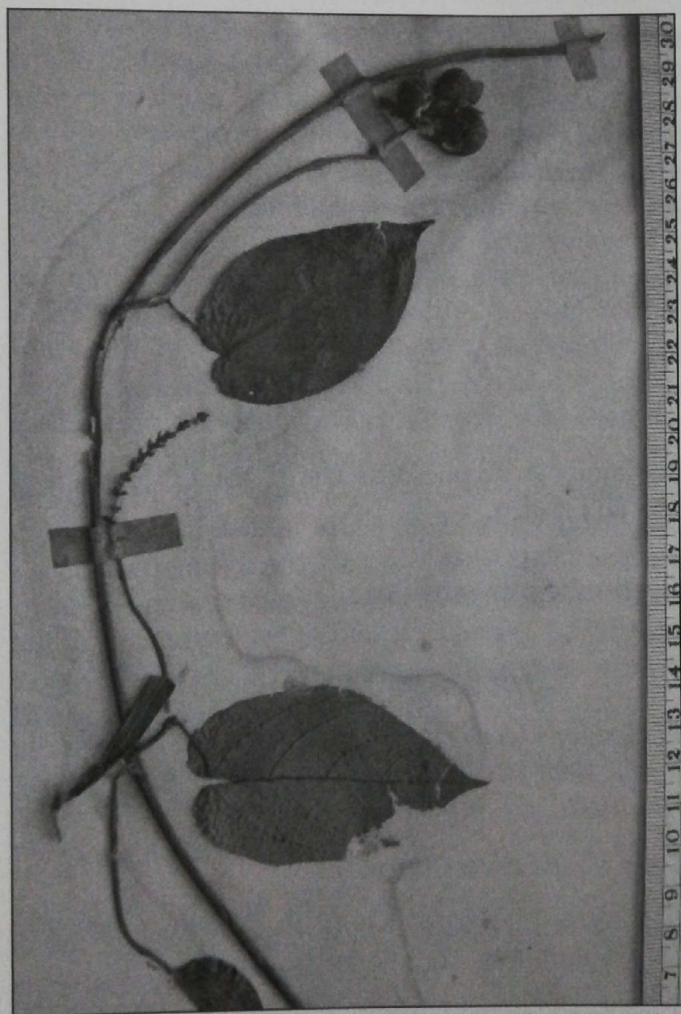


Figure 1. *Megistostigma burmanicum* (Kurz) Airy Shaw (H. Collett 150)

Type: MYANMAR, **Martaban**, Kurz 1552 (CAL, K, photo!); **Pegu**, Toukyequht, Nakawa chu, Kurz 1552 (CAL herb. acc. nos. 418218/20) – Syntypes.

Large twining shrubs; branches pale to dark brown, terete, 1-4 mm thick, appressed greyish puberulous when young, soon glabrous. *Leaves* ovate, widely ovate to ovate-oblong, (4-) 7-24 x (2.5-) 4-12 cm,

cordate at base, irregularly serrulate towards base and the rest entire along margins, caudate-acuminate to cuspidate-acuminate (acumen 5-25 mm long, acute) at apex, chartaceous, greyish/brown puberulous, sparsely setose or strigose to glabrous above, sparsely greyish puberulous or hispid on midrib to glabrous beneath, brown above when dry, pale greenish beneath, 3(-5) nerved at base; midrib slender, flat above, slightly raised beneath; lateral primary veins slender, ascending about halfway along the lamina; lateral nerves slender, 4-5 per side above the basal, arcuate, faint above, prominent beneath, brochidodromous; tertiary nerves obscure above, prominent beneath, scalariform; petioles terete, 10-20 mm long, 1-2 mm thick, sparsely appressed puberulous to glabrous; stipules not seen. *Racemes* axillary, terminal or leaf-opposed, 8-15 cm long with one female flower at base and several male flowers above; peduncles 1.5-7 cm long, 1-1.5 mm thick towards base, scattered appressed brown or white puberulous to glabrous; bracts and bracteoles ovate-lanceolate to linear-lanceolate, sparingly puberulous to glabrous. *Male flowers*: pedicels c. 0.5 mm long; bracts c. 2.5 x 1.5 mm; bracteoles c. 1.5 x 0.5 mm; sepals 3, orbicular-ovate to deltoid-ovate, 1.5-2 mm across, minutely papillose to glabrous; disc annular; stamens 3; filaments c. 0.3 mm long; anthers broadly obconic, c. 0.3 mm long; connective shortly produced. *Female flowers*: pedicels c. 0.5 mm long; bracts c. 4 x 3 mm; bracteoles c. 4 x 2 mm; sepals 6, oblong-lanceolate, entire, 7-8 mm long, c. 3 mm wide, accrescent and stellately spreading in fruit; ovary subglobose, 3-lobed, c. 2 x 2.5 mm, densely fulvous hirsute; styles united into a subglobose mass (c. 1 mm across). *Capsules* depressed, c. 0.8 x 2-2.5 cm, deeply 3-lobed, black when dry, ochraceous setose or hispid; seeds globose, c. 6 mm in diameter, black, finely papillose-tomentellous; fruiting sepals ovate, 1.5-2 x c. 1 cm, entire, densely fulvous hispid or setose outside (setae up to 5 mm long), fulvous hispid towards base or throughout inside.

Flowering & Fruiting: March – May.

Distribution: India (Nagaland), Myanmar, Thailand, Malaysia.

Habitat: Tropical forests at about 600 m. in Nagaland.

Specimen Examined: INDIA, **Nagaland**, Naga hills, 20 April 1882, H. Collett 150 (CAL).

Tragia L.

Sp. Pl. 980. 1753 et Gen. Pl. ed. 5, 421. 1754; Roxb., Fl. Ind. 3: 575. 1831; Baill., Et. Gen. Euphorb. 459. 1858

Müll.Arg. in DC., Prodr. 15(2): 927. 1866; Benth. in Benth. & Hook.f., Gen. Pl. 3: 329. 1880; Hook.f., Fl. Brit. India 5: 466. 1888; Pax in Engler, & Prantl., Pflanzenfam. III (5): 64. 1890; Trimen, Handb. Fl. Ceylon 4: 61. 1898; Pax & Hoffm. in Engler, Pflanzenr. IV.147.ix-xi (heft 68): 32. 1919; Gamble, Fl. Pres. Madras 2(7): 1331. 1925; Webster, J. Arn. Arb. 48: 376. 1967; Philcox in Dassan. & Clayton, Rev. Handb. Fl. Ceylon 11: 138. 1997.

Type : *T. volubilis* L.

Herbs, usually twining climbers, perennial, monoecious or dioecious, hispid with stinging hairs. *Leaves* alternate, simple or palmately 3-lobed or 3-partite, serrate or dentate, palmately 3-5-nerved at base, petiolate; stipules prominent, early caducous. *Flowers* in terminal or leaf-opposed androgynous bracteate racemes, with many male flowers in upper nodes and one or a few female flowers at lower nodes; bracts small; petals and disc absent. *Male flowers*: calyx globose or obovoid, valvately 3-5-partite; stamens (1-) 3, rarely more; filaments short, free or connate; anthers 2-locular with contiguous parallel thecae. *Female flowers*: calyx of 6 imbricate, usually pinnatifid lobes, enlarged and spreading stellately in fruit; ovary 3-loculed; ovule one in each locule; styles united at base into a column, 3-fid and spreading or revolute above. *Fruits* capsular, depressed, consisting of 3 bivalved cocci; endocarp crustaceous; seeds 3, globose; testa crustaceous; endosperm fleshy; cotyledons broad, flat.

Key to species

- 1a. Leaves palmately 3-lobed.....**T. plukenetii**
- 1b. Leaves unlobed..... **2**
- 2a. Leaves rounded, obtuse, acute to cuneate at base**3**
- 2b. Leaves cordate or narrowly so at base.....**4**
- 3a. Leaves 6-12 times longer than broad, 4-20 x 0.4-2.6 cm, irregularly and distantly serrulate to entire along margins, attenuate or attenuate-caudate at apex, penninerved or very weakly trinerved at base with basal lateral nerves extending 10-30 % way up the lamina; secondary venation mostly brochidodromous; lateral nerves 7-15 per side above the basal; fruiting calyx lobes 0.3 – 2 mm long**T. sanjappae**
- 3b. Leaves 1.5-5 times longer than broad, 3.5-16 x 1-6.5 cm, serrate to serrulate or dentate to denticulate along margins, caudate at apex,

prominently trinerved at base with basal lateral nerves extending 30-80 % way up the lamina; secondary venation predominantly semicraspedromous or often craspedromous; lateral nerves 3-7 per side; fruiting calyx lobes 1.5-3 mm long **T. involucrata**

- 4a. Mature branches, leaves and petioles usually glabrous to subglabrous; main body of fruiting sepals ovate to broadly ovate with lacerate-fimbriate margins, usually enclosing the fruits**T. montana**
- 4b. Mature branches, leaves and petioles usually hispid or hirsute; main body of fruiting sepals linear or narrowly oblong or spatulate with 4-8 linear or narrowly oblong lobes per side, spreading stellately in fruit**5**
- 5a. Young shoots, upper branches and leaves densely golden yellow tomentose.....**T. bicolor**
- 5b. Young shoots, upper branches and leaves scattered fulvous hirsute**6**
- 6a. Leaves 4-6 times longer than broad, 5-14 x 1-5 cm, lanceolate to oblong-lanceolate, entire or with 2-3 teeth towards base or remotely serrate or serrulate at basal half along margins, attenuate to attenuate-caudate at apex; lateral nerves brochidodromous **T. hispidia**
- 6b. Leaves 2-3 times longer than broad, ovate, cordate-ovate, ovate-oblong, ovate-elliptic, oblong, oblong-elliptic or deltoid-oblong, evenly serrate to serrulate or dentate to denticulate along margins, caudate or acuminate at apex; lateral nerves craspedromous to semicraspedromous **T. praetervisa**

Tragia bicolor Miq. in Linnaea 26: 222. 1853; Baill., Et. Gen. Euphorb. 461. 1858; Hook. f., Fl. Brit. India 5: 465. 1888; Pax & Hoffm. in Engler, Pflanzenr. IV.147.ix-xi (heft 68): 80. 1919; Gamble, Fl. Pres. Madras 2(7): 1332. 1925; Chandrabose in A.N. Henry et al., Fl. Tamil Nadu, Ser. I. Analysis 2: 240. 1987.

Type: India, Nilgiri hills, *Hohenacker* 1552 (K, photo!).

T. miqueliana Müll.Arg. var. *bicolor* (Miq.) Müell.Arg. in DC., Prodr. 15(2): 942. 1866.

Herbaceous climbers with twining stems; young shoots, upper branches and leaves golden yellow tomentose; branches brown to dark brown, flat and striate towards apices, terete towards base, 1-3 mm thick, scattered fulvous or ochraceous hispid or hirsute, glabrous in age. *Leaves* cordate-ovate (or narrowly so), orbicular-ovate to ovate-lanceolate or narrowly

ovate-oblong, 4-16 x 1.5-6.5 cm, cordate to subcordate at base, serrate to serrulate along margins, caudate (cauda 5-15 mm long, acute) or occasionally apiculate at apex, chartaceous, densely to sparsely fulvous or brown appressed hispid, hirsute or scabrid above, coarsely grey or fulvous tomentose or scattered hirsute (on nerves) to glabrous beneath, pale greenish, brown, dark brown to blackish brown above when dry, greenish brown to dark brown beneath, 3-nerved at base; midrib slightly raised above, raised beneath; lateral primary veins slender, extending 40-60 % way up the lamina; lateral nerves slender, 3-5 per side, ascending, arcuate, faint above, prominent beneath, craspedromous to semicraspedromous; tertiary nerves obscure to faint above, faint beneath, scalariform; petioles 5-35 x 0.8-1.8 mm, channeled above, scattered ochraceous or brown hispid or hirsute, sparsely so in age; stipules triangular-lanceolate, c. 3 x 1.2 mm, scattered ochraceous hirsute outside, caducous. *Racemes* axillary, terminal or leaf-opposed, 2-5 cm long, with 1-3 female flowers at proximal end and several male flowers at distal end; flowers green or white with irritating smell; peduncles 0.5-3 cm long, 0.7-1 mm thick towards base, ochraceous or brown tomentellous to hirsute; bracts linear to lanceolate, 1.5-4 x 0.3-0.6 mm, fulvous hirsute outside. *Male flowers*: pedicels c. 1 mm long, slender; sepals 3, broadly ovate to suborbicular, 1-1.3 x 0.7-1 mm, ciliate along margins; stamens 3; filaments slender, c. 0.3 mm long; anthers oblong, c. 0.3 mm long. *Female flowers*: sessile to subsessile; sepals 6, 3-5 x 3-4 mm, densely ochraceous hirsute outside, enlarging and stellately spreading in fruit; ovary depressed, c. 1.5 mm across, 3-lobed, densely ochraceous hirsute; styles c. 2.5 mm long, connate below into a column; trifid at apex. *Capsules* subsessile, 4-5 x 8-10 mm, deeply 3-lobed, brown when dry, fulvous hirsute; seeds globose, c. 4 mm in diameter, black; fruiting sepals 6-10 x 3-6 mm (including lobes); main body linear to oblong, ochraceous hispid or hirsute to glabrous outside, brown or ochraceous hirsute inside; lobes 4-8 per side, linear, 1.5-3 mm long, ochraceous hispid or hirsute.

Flowering & Fruiting: Throughout the year

Distribution: India (Western Ghats-Nilgiri and Pulney hills of Tamil Nadu and Karnataka), endemic.

Habitat: Common in shola forests, between 1400-1700 m., rare in Karnataka.

Specimens Examined: INDIA, **Penins. Ind. Or.**, n. d., Wight KD 2621 & KD 2625. **South India**, Kumbaru, May 1917, Blatter & Hallberg 885; **High wavy mountains**, May 1917, Blatter & Hallberg 290. **Karnataka**, Coorg distr., Harangi

river bank, 2 March 1963, A.S. Rao 86658. **Tamil Nadu**, Anna distr. Pulney hills, Periya shola, 13 July 1898, Bourne 177; *ibid.*, 9 July 1899, Bourne 28; Shembaganur, 14 May 1913, Sauliere 927; Tiger shola, 23 July 1912, Munch 90; Nilgiri distr.: Coonoor, 15 March 1870, C.B. Clarke 10870 C; *ibid.*, Apr. 1883, Gamble 12164; *ibid.* Sept. 1883, Gamble 12717; Pykara, Aug. 1878, King s. n. (CAL herb. acc. no. 418209); Road to Kil-Kotagiri, 5 Jan. 1957, Subramanyam 1948; This shola, 3 Feb. 1913, C.E.C. Fischer 3536 (all CAL); Marapalam, 20 Jan. 1957, Sebastine 2134 (CAL, MH).

Note: This species is very closely allied to *T. praetervis* but its golden yellow tomentum makes it a distinct species.

Tragia hispida Willd., Sp. Pl. 4: 323. 1805; Baill., Et. Gen. Euphorb. 461. 1858; Pax & Hoffm. in Engler, Pflanzenr. IV.147.ix-xi (heft 68): 79. 1919, *p.p.*, excl. syn. *T. involucrata* var. *angustifolia* Hook.f.; Bennet, Fl. Howrah Distr. 210. 1979, *p.p.*, excl. syn. *T. involucrata* var. *angustifolia* Hook. f.

Type: India, Roxburgh s. n. in herb. Willdenow Fol. No. 17346 (B-WILLD, microfiche!).

T. involucrata L. var. *hispida* (Willd.) Müll.Arg. in DC., Prodr. 15(2): 943. 1866.

T. involucrata sensu Duthie, Fl. Upper Gang. Plains 2: 114. 1905, *p.p.*, non L. 1753.

Climbers up to 1 m high; young shoots densely fulvous or ochraceous hispid or hirsute; branches greenish, brown to dark brown, flat and striate towards apices, striate to terete towards base, 1.5-4 mm thick, scattered fulvous hirsute. *Leaves* lanceolate to oblong-lanceolate, 5-14 x 1-5 cm, cordate or narrowly so at base, entire or with 2-3 teeth towards base or remotely serrate or serrulate at basal half along margins, attenuate to caudate-attenuate (cauda 10-35 mm long, acute) at apex, membranous to chartaceous, scattered appressed fulvous or greyish hispid (sparse in age) above and beneath; greenish brown to brown above when dry, pale green to brown beneath, 3-nerved at base; midrib slender, slightly raised above and beneath; lateral primary veins slender, extending 30-50 % way up the lamina; lateral nerves slender, 4-8 per side above the basal, arcuate, faint to prominent above, conspicuous beneath, brochidromous or rarely semicraspedromous; tertiary nerves obscure to faint above, faint to prominent beneath, scalariform or occasionally laxly reticulate; petioles 5-20 mm long, 1-2 mm thick, channeled above, densely fulvous hirsute or hispid; stipules linear-lanceolate, 3-5 mm long, acuminate, glabrous, caducous. *Racemes* terminal or leaf opposed, 5-18 cm long, bearing 1 or 2 female flowers at basal nodes and several to many

male flowers at distal nodes; peduncles 2-9 cm long, 1-2 mm thick at base, densely fulvous hirsute; bracts linear, subulate, lanceolate or ovate (in female), 2-3 mm long. *Male flowers*: pedicels 0.5-1 mm long, suborbicular, c. 1.5 mm across, sparsely fulvous puberulous to glabrous outside; stamens 3; filaments thick, c. 0.3 mm long, united at base; anthers oblong to suborbicular, c. 0.4 mm long/across. *Female flowers*: subsessile; sepals 6, 4-6 mm long, fimbriate, enlarging and stellately spreading in fruits; ovary subglobose, c. 2 mm in diameter, 3-lobed, fulvous hispid; styles c. 2.5 mm long, connate at base into a column, trifid and reflexed above. *Capsules* subsessile, depressed, 3-4 x 10-12 mm, deeply 3-lobed, black when dry, scattered fulvous hirsute or hispid; seeds globose, 5-6 mm in diameter, grey or greenish and mottled brown; fruiting sepals 8-10 x 6-8 mm (including lobes); main body of sepals oblong to linear, densely fulvous hispid to subglabrous outside, hirsute or sparsely hispid to glabrous inside; lobes of sepals 4-8 per side, linear to filiform, 2-6 mm long, often arching, densely fulvous hispid or hirsute.

Flowering & Fruiting: August – March.

Distribution: India (Assam, Bihar, Uttaranchal, West Bengal) and Bangladesh.

Habitat: Rare but common at Mourigram in shrubberies and along railway track in Howrah district.

Specimens Examined: INDIA, **Assam**, Without locality, 5 Nov. 1841, *Jenkins s. n.* (Acc. no. 418164) – central specimen. **Bihar**, Muzaffarpur distr., Dalsing Sarai, 20 Aug. 1902, *Prain s. n.* (Acc. no. 418127). **Uttaranchal**, Lakhimpur Kheri distr., Kheri, May 1898, *Inayat* 22765. **West Bengal**, HBC, June 1889, *S.K. Ismail* 56; *ibid.*, *Wallich* 7791E; Lower Bengal, n. d., *Kurz s. n.* (Acc. no. 418129); Howrah distr., Bally, 31 July 1900, *Deschamps s. n.* (Acc. no. 418133); Mourigram, 18 Nov. 1963, *Bennet* 435; *ibid.*, 24 Jan. 1965, *Bennet* 1103 (all at CAL). BANGLADESH, **East Bengal**, n.d., *Griffith* KD 4718 (CAL) – lower right hand side specimen.

Tragia involucrata L., Sp. Pl. 980. 1753; Roxb., Fl. Ind. 3: 576. 1832; Voigt, Hort. Suburb. Calcutt. 160. 1845; Baill., Et. Gen. Euphorb. 461. 1858; Dalz. & Gibs., Bombay Fl. 228. 1861, p.p.; Thw., Enum. Pl. Zeyl. 270. 1861, p. p. excl. CP 2100 & CP 2951; Müll. Arg. in DC., Prodr. 15(2): 943. 1866, p.p. *quoad* var. *genuina* & var. *rheedeana*, p. p.; Hook. f., Fl. Brit. India 5: 465. 1888, p. p., excl. *T. hispida* Willd. & excl. vars; Trimen, Handb. Fl. Ceylon 4: 61. 1898, p.p.; Prain, Bengal Pl. 2: 952. 1903; Duthie, Fl. Upper Gang. Plains 2: 114. 1905, p.p.; T. Cooke, Fl. Pres. Bombay 2: 621. 1906, p.p.; Pax & Hoffm. in Engler, Pflanzenr. IV.147.ix-xi (heft 68): 81.

1919; Gamble, Fl. Pres. Madras 2(7): 1332. 1925; A. Das in Kanjilal *et al.*, Fl. Assam 4: 222. 1940; Ramamoorthy in Sald. & Nicols., Fl. Hassan Distr. 349. 1976; Bennet, Fl. Howrah Distr. 210. 1979; Deb, Fl. Tripura 1: 353. 1981; Short & Vickery in Hara *et al.*, Enum. Fl. Pl. Nepal 3: 199. 1982; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1479. 1983; Chandrabose in A.N. Henry *et al.*, Fl. Tamil Nadu, Ser. I. Analysis, 2: 240. 1987; Parmar in Shetty & Singh, Fl. Rajasthan 2: 792. 1991; Mohanan & A.N. Henry in Fl. Thiruvananthapuram 427. 1994; Philcox in Dassan. & Clayton, Rev. Handb. Fl. Ceylon 11: 141. 1997; Londhe in N.P. Singh *et al.*, Fl. Maharashtra State 2: 904. 2001.

Type: Sri Lanka, Fl. Zeylanica 2: 12, p. 161, no. 340 – Hermann Herbarium (BM); Fl. Zeylanica 2: 84 & 3: 14 (syntypes).

Erect herbs or shrubs, c. 1 m. high or twining up to 3 m long; branches greenish to brown, compressed and striate towards apices, terete towards base, 1-5 mm thick, densely fulvous, brown or greyish hispid. *Leaves* successively smaller upwards, ovate to suborbicular, ovate-lanceolate to lanceolate, oblong-elliptic, oblong-lanceolate to elliptic-lanceolate (very rarely 3-lobed at apex), 3.5-16 x 1-6.5 cm, rounded, obtuse, acute to cuneate or occasionally subtruncate at base, serrate to serrulate or dentate to denticulate along margins, caudate (cauda 5-25 mm long, acute) or occasionally attenuate-caudate at apex, membranous to chartaceous, scattered fulvous/brown hispid or hirsute above, densely or scattered hispid or hirsute beneath, green to brown above when dry, pale brown to green beneath, 3 (-5)-nerved at base; midrib slightly raised above, and beneath; lateral primary veins ascending 30-80 % way along the lamina; lateral nerves slender, 3-7 per side above the basal, faint to prominent above, conspicuous beneath, arching, predominantly semicraspedromous or often craspedromous; tertiary nerves obscure to faint above, faint to prominent beneath, scalariform; petioles 2-40 mm long, 1-3 mm thick, fulvous or brown hispid, flat to semiterete or striate; stipules lanceolate, 2-4 x 1-2 mm, subhastate at base, caducous. *Racemes* terminal or leaf opposed, 1.5-3 (-4) cm long with 1 or 2 female flowers at proximal nodes and several male flowers at distal nodes; yellowish, pale blue or greenish; peduncles 0.5-2 cm long, c. 1 mm thick towards base, ochraceous hirsute; bracts lanceolate, oblong or oblanceolate, 1-3 x 0.5-0.7 mm, glabrous. *Male flowers*: pedicels 1.5-2 mm long, slender, glabrous; sepals 3, wide ovate to suborbicular, c. 1 mm long/across; stamens 3; filaments dilated at base; anthers oblong to

suborbicular, c. 0.3 mm long/across. *Female flowers*: subsessile; sepals 6, c. 3 x 1 mm, lobed along margins, enlarging and stellately spreading in fruit; ovary globose, 1.5-2 mm in diameter; ochraceous hispid; styles 3-4 mm long, connate at base into a column, 3-fid at apex. *Capsules* subsessile, depressed, 3-4 x 7-9 mm, deeply 3 lobed, brown when dry, evanescently fulvous hispid; seeds subglobose, 3-4 x 2.5-3 mm, pale brown to brown, mottled brown or dark brown, glabrous; fruiting sepals 5-8 x 2-3 mm (including lobes); main body linear to linear-oblongate, yellow or brown hispid outside, glabrous inside; lobes 4-6 per side, linear, 1.5-3 mm long, hispid.

Flowering & Fruiting: Throughout the year.

Distribution: India, Sri Lanka, Bangladesh.

Habitat: Common in deciduous forests, scrubs, outskirts of forests, waste places, along railway tracks, road sides and cultivated fields, on sandy humus soil or clayey loam, up to 1100 m.

Specimens Examined: INDIA, **Andhra Pradesh**, Cuddapah distr. Balasamudram, July 1884, *Gamble* 15199 (CAL). E. Godavari distr.: Rampa hills, n. d., *Narayanaswamy* s. n. (Acc. no. 418144). Krishna distr., Kondapalle fort, 15 Feb. 1985, *Venkanna* 6000. Visakhapatnam distr., Forest near Araku, 24 Aug. 1960, *Balakrishnan* 10820; Kothuru, 28 Sept. 1961, *Balakrishnan* 869. **Jharkhand**, Singhbhum distr., Chaibasa, March 1967, *Majumder & Biswas* 15; Singhbhum, 16 Jan. 1903, *Haines* 596; Manbhum, n. d., *Campbell* 7579. **Karnataka**, Bangalore distr., Tippagondana halli, 23 Sept. 1978, *Manohar & Keshava Murthy* KFP 2816. Kolar distr., Kendatty hills, 10 July 1979, *Prakash* KFP 8270. **Kerala**, Kottayam distr., Changanacherry, 4 Feb. 1988, *Fr. Kadavil* 1469; Malappuram distr., Doni (South Malabar), 9 June 1910, *C.E.C. Fischer* 1980 (all at CAL); Trichur distr., Vahani RF, 26 Sept. 1982, *Ramamurthy* 74868; Koratti - Chalakudi route, 8 Feb. 1984, *Ramamurthy* 80424; Thiruvananthapuram distr., Pulimath, 19 Nov. 1979 *M. Mohanan* 65127; Quilon distr., Kodumou, 3 Aug. 1978, *C.N. Mohanan* 58382 (all at CAL, MH). **Lakshasweep**, Ameni Island, 25 Sept. 1959, *Srinivasan* s. n.; *ibid.*, 7 Dec. 1960, *Wadhwa* 68775. **Madhya Pradesh**, Bailadila, 15 Feb. 1963, *Panigrahi* 6994. **Orissa**, Sambalpur distr., Jailchhaka, 6 Nov. 1986, *Panda & Das* 389; Simlipal BR, Baniabara, n. d., *Bahali* 610. Puri distr., Balugaon, Chilka lake, 10 Aug. 1915, *Hooper* 39593. **Herb. Madras**, Wallich 7791B. **Tamil Nadu**, Coimbatore distr., Tamarakarai, 7 Aug. 1905, *C.E.C. Fischer* 127 (all at CAL). Dharmapuri distr., Reddihalli - Dharmapuri, 16 July 1978, *Vajravelu* 57820; Kanniyakumari distr., Colachal, 7 Dec. 1980, *Swaminathan* 68960; Madurai distr., Periathopu - Allampatti, 21 Sept. 1957, *Subramanyam* 4325; Ramanathapuram distr., Kanadukathen, 1 Dec. 1977, *N.C. Nair* 52991; S. Arcot distr., Kaduvanoor RF, 6 Sept. 1977, *Ramamurthy* 50604 (all at CAL,

MH). Tiruchirapalli distr., Kavathananoor, 17 Feb. 1978, *Perianayagam & Diraviam* 11993; Tirunelveli distr., Kasimajorpuram - Courtallam, 28 July 1957, *Subramanyam* 3890 (all at CAL); Thanjavur distr., Muthupet, 20 May 1978, *V.J. Nair* 56565 (CAL, MH). **Travancore**, Near Mekarai, 6 Sept. 1913, *Calder & Ramaswamy* 633. **Tripura**, Vaughmun, 23 Jan. 1962, *Deb* 27093. **Uttar Pradesh**, Bahraich distr., Shahpur moti, 2 Sept. 1965, *Misra* 7789. **West Bengal**, Bankura distr., R. N. College, 12 March 1965, *Sanyal* 608; Hooghly distr., Konnagar, 26 Nov. 1967, *S. Sen* 2; Howrah distr., Without locality, n. d., *Kurz* s. n. (Acc. nos. 418124/34); Andul, 4 Dec. 1963, *Bennet* 447; Malda distr., Khejuria bus stand, 21 Nov. 1965, *R.M. Dutta* 107. Midnapur distr., Khajuri, 6 Dec. 1975, *Maji* 2561; Dinajpur distr. (S), Sibdangi, 5 Nov. 1983, *R.N. Banerjee* 16183; Purulia distr., Kolma forest, 19 Sept. 1964, *Malick* 185 (all at CAL).

BANGLADESH, **East Bengal**, *Griffith* KD 4718-except lower RHS specimen. Chittagong distr., Chittagong station, 30 Apr. 1880, *Wood* s. n. (Acc. no. 418121). Dacca, 1 July 1868, *Clarke* 7398 (all at CAL).

SRI LANKA, Without locality, n. d., *No collector* CP 2099 & CP 2951 (CAL).

Tragia montana (Thw.) Müll.Arg., *Linnaea* 34: 183. 1865 & in DC., *Prodr.* 15(2): 944. 1866; Pax & Hoffm. in Engler, *Pflanzenr.* IV.147. ix-xi (heft 68): 81. 1919.

T. involucrata L. var. *montana* Thw., *Enum. Pl. Zeyl.* 270. 1861.

Type: SRI LANKA, Nuwara Eliya, 1860, *No collector* CP 3519 (BM, photo!, CAL, K, photo!, PDA - n. v.).

T. involucrata var. *cordata* Müll.Arg., *l. c.* 943. 1866; Hook. f., *Fl. Brit. India* 5: 465. 1888; Trimen, *Handb. Fl. Ceylon* 4: 62. 1898, *p. p.*, excl. CP 2100.

Type: SRI LANKA, Nuwara Eliya, 1860, *No collector* CP 3519 (BM, photo! K, photo!, PDA, n. v.).

T. muelleriana Pax & Hoffm., *l. c.* 80. 1919, excl. var. *unicolor* *syn. nov.* Gamble, *Fl. Pres. Madras* 7: 1332. 1925; Chandrabose in A.N. Henry *et al.*, *Fl. Tamil Nadu*, Ser. I. Analysis, 2: 241. 1987; Vajravelu, *Fl. Palghat Distr.* 439. 1990; Philcox in Dassan. & Clayton, *Rev. Handb. Fl. Ceylon* 11: 142. 1997.

Type: Not designated.

T. muelleriana var. *cordata* (Müll.Arg.) Pax & Hoffm., *l. c.* 81. 1919. *T. cordata* Heyne in Wall. Cat. No. 7791 A. 1847, *nom. nud.*

T. muelleriana var. *unicolor* *auct. non* (Müll.Arg.) Pax & Hoffm. 1919: Deshpande *et al.*, *Fl. Mahabaleshwar* 2: 545. 1995, *p. p.*, excl. *syn.*; Londhe in N.P. Singh *et al.*, *Fl. Maharashtra State* 2: 904. 2001, *p. p.*, excl. *syn.*

The species is closely related to *T. hispida* and *T. praetervisa*, differing from both in ovate to widely ovate fruiting sepals with fimbriate-laciniate margins. They usually cover and enclose the fruits rather than spreading stellately exposing them. Moreover, the branches and leaves have less persistent hairs becoming glabrous very soon.

T. muelleriana was described without a type. After removal of var. *unicolor* to *T. praetervisa*, the only point of reference of this species is var. *cordata*, which is found to be same as *T. montana* and therefore *T. muelleriana* is reduced here as a synonym of *T. montana*.

Key to varieties

- 1a. Plants monoecious; inflorescence bisexual.....
.....var. **montana**
- 1b. Plants dioecious; inflorescence unisexual
.....var. **dioica**

var. **montana**

Slender climbers; young shoots densely ochraceous hirsute; branches dark brown or reddish brown, flattened and/or striate towards apices, terete towards base, 1-4 mm thick, densely fulvous hispid but very soon glabrous. *Leaves* cordate-ovate to suborbicular, ovate-oblong to ovate-elliptic or deltoid-ovate to deltoid-oblong, 4-16 x 1.5-8 cm, cordate to subcordate at base, dentate, serrate or denticulate-serrulate along margins, caudate (cauda 5-25 mm long, acute) at apex, membranous to thinly chartaceous, scattered fulvous/ochraceous hispid or hirsute or scabrid above, sparsely so in age, scattered fulvous hispid or hirsute (mainly on nerves) to glabrous beneath, green, olivaceous, brown to dark brown above when dry, pale green to greenish brown beneath, 3-nerved at base; midrib slightly raised above, raised beneath; lateral primary veins slender, ascending 40-70 % way along the lamina; lateral nerves 4-6 pairs above the basal, slender, faint to somewhat prominent above, conspicuous beneath, arcuate, semicraspedromous to craspedromous; tertiary nerves obscure or faint above, prominent beneath, scalariform; petioles 5-40 mm long, 0.8-2 mm thick, sulcate above, scattered fulvous or whitish hirsute or hispid to glabrous; stipules lanceolate, 3-4 mm long, acuminate. *Racemes* terminal and leaf-opposed, 3-7 cm long, with 1 or 2 female flowers at proximal nodes and several to many male flowers at distal nodes, yellowish green; peduncles 0.5-4 cm long, 0.4-1 mm thick towards base, fulvous/ochraceous

tomentellous, hirsute or hispid; bracts narrowly ovate-oblong, linear or lanceolate, 1-4 mm long. *Male flowers*: pedicels 1-2 mm long, slender, sparsely puberulous; sepals 3, ovate or suborbicular, c. 1 mm long/across, glabrous; stamens 3; filaments triangular, c. 0.4 mm long; anthers oblong, c. 0.4 mm long. *Female flowers*: subsessile; sepals 6, ovate or broadly so, c. 5 x 5 mm, fimbriate, enclosing and covering the fruits or occasionally stellately spreading; ovary subglobose, 1-1.5 x 1.5-2 mm, 3-lobed, fulvous or ochraceous hispid or hirtellous; styles 2-5 mm long, united at base into a column, trifid and recurved at apex. *Capsules* subsessile, depressed, 4-5 x 10-12 mm, deeply 3-lobed, evanescently fulvous hispid, yellowish; seeds globose, c. 4 mm in diameter, pale brown, mottled brown; fruiting sepals 6, usually enclosing the fruits, 8-10 x 5-10 mm; main body of sepals ovate or broadly so, lacerate-fimbriate along margins, appressed fulvous puberulous, hispid or hirsute, sparsely pilose or glabrous outside, scattered fulvous puberulous, sparsely pilose or glabrous inside; marginal lacinae (or lobes) numerous, 1-3 mm long, often arching, fulvous hispid or hirsute.

Flowering & Fruiting: August – February.

Distribution: India, (Western Ghats - Karnataka, Kerala, Tamil Nadu), Sri Lanka.

Habitat: Hill slopes between 650 - 1800 m., scarce.

Specimens Examined: INDIA, **Peninsular India**, Belyaun, n. d., *S. Ritchio* 674. **Karnataka**, Coorg distr.: Katagari road, Mercara, 25 Sept. 1961, *No collector* 74635; On way to Thodiandamol, 10 Feb. 1976, *B.C. Banerjee* 11634. **Kerala**, Cochin, Kavalay, Nov. 1909, *Meebold* 12260 (all at CAL). Cannanore distr.: Way to Peria Chandanathode, 9 Dec. 1967, *Ellis* 29548; Chandanathode, 13 Feb. 1978, *Ramachandran* 53921; Idukki distr., Meenmutty, 26 Sept. 1981, *C.N. Mohanan & B. Ramanujam* 72000; Palghat distr.: Silent valley RF, 11 Jan. 1979, *Vajravelu* 59103; Aruvampara slopes, 19 Jan. 1980, *Bhargavan* 65594; Near Karapara estate hospital, 26 Dec. 1980, *N.C. Nair* 69837; Quilon distr., Nilakkal – on way to Ayappan Kovil, n. d., *N.C. Nair* 50796; (all at CAL, MH). **Tamil Nadu**, Nilgiri distr., Pandalur, 11 Jan. 1903, *Barber* 5597 (CAL). **SRI LANKA**, Without locality, *No collector* CP 3519 (BM photo!; CAL herb. Acc. no. 418168, K, photo! - type).

var. **dioica** Chakrab. et N.P. Balakr., *var. nov.*

Tragia involucrata sensu T. Cooke, Fl. Pres. Bombay 2: 621. 1906, p.p., non L. 1753.

Differt a var. *montana* plantis dioecis et inflorescentiis unisexualibus.

Type: INDIA, **Deccan**, n. d. T. Cooke 59 (Holotype, CAL); **Maharashtra**, Lingmale, 6 October 1957, G. S. Puri 25635 (Paratype, CAL).

Differing from var. *montana* in dioecious habit and having unisexual inflorescences.

Climbers with stinging hairs. *Male flowers* not seen. *Female racemes* leaf opposed, 3-7 cm long, with c. 5 flowers per raceme; peduncles 1-4 cm long, 0.5-0.8 mm thick towards base; flowers subsessile; sepals 6, c. 6 x 4 mm, wide ovate, fimbriate-laciniate; main body of sepals hirtellous; lobes of sepals 1-2 mm long.

Flowering: October - November.

Distribution: India

Tragia plukenetii Radcl.-Sm., Kew Bull. 37: 688. 1983; Rani in Matthew, Fl. Tamil Nadu Carnatic 3(2): 1480. 1983; Chandrabose in A.N. Henry *et al.*, Fl. Tamil Nadu, Ser. I. Analysis, 2: 241. 1987; Parmar in Shetty & Singh, Fl. Rajasthan 2: 793. 1991; Philcox in Dassan. & Clayton, Rev. Handb. Fl. Ceylon 11: 139. 1997; Londhe in N.P. Singh *et al.*, Fl. Maharashtra State 2: 905. 2001.

Croton hastatus L., Sp. Pl. 1005. 1753 & Syst. Veg. ed. 13, 722. 1767 (non *Tragia hastata* Müll.Arg.).

Type: Plukenet, Phytographia t. 220, f. 2 1692.

Tragia cannabina L. f., Suppl. Pl. 415. 1781; Roxb., Fl. Ind. 3: 575. 1832; Voigt, Hort. Suburb. Calcutt. 160. 1845; Baill., Et. Gen. Euphorb. 461. 1858; Thw., Enum. Pl. Zeyl. 270. 1861; Dalz. & Gibs., Bombay Fl. 228. 1861; Duthie, Fl. Upper Gang. Plains 2: 114. 1905; Pax & Hoffm. in Engler, Pflanzenr. IV. 147. ix-xi (heft 68): 84. 1919; Gamble, Fl. Pres. Madras 2(7): 1333. 1925; Alston in Trimen, Handb. Fl. Ceylon 6: 266. 1931; Bole & Pathak, Fl. Saurashtra, Pt. II. 289. 1988.

T. involucrata var. *cannabina* (L.f.) Müll.Arg. in DC., Prodr. 15(2): 944. 1866; Hook. f., Fl. Brit. India 5: 465. 1888; Trimen, Handb. Fl. Ceylon 4: 62. 1898.

T. involucrata var. *intermedia* Müll.Arg., l. c. 944. 1866.

Erect or straggling shrubs to c. 1 m.; branches brown, greenish brown or greyish, flattened and striate towards apices, terete towards base, 1-5 mm thick, scattered fulvous, brown or grey hispid, glabrous in age. *Leaves* palmately 3-lobed or rarely unlobed or 2-lobed with one lateral lobe suppressed, 3-10 x 1.5-7 cm, chartaceous, sparsely yellow hispid to glabrous above, sparsely white or fulvous hispid or hirsute on nerves to subglabrous beneath, green to brown above when dry, paler beneath, 3-nerved at base; central lobe narrowly oblong or obovate in outline, 1.5-8 x 0.5-2 cm, irregularly crenate-serrate

along margins; lateral lobes 0.5-4 x 0.3-1.5 cm; midrib flat above, raised beneath; lateral primary veins entering into lateral lobes; lateral nerves (on central lobe) slender, 3-7 per side, faint above, prominent beneath, predominantly craspedromous; tertiary nerves faint above, prominent beneath, scalariform; petioles 3-20 mm long, 0.6-2 mm thick, flat or semiterete, scattered yellow, brown hispid or hirsute to glabrous; stipules linear-lanceolate, 3-4 mm long, acuminate. *Racemes* terminal on lateral shoots or leaf-opposed, 2-5 cm long, consisting of solely male flowers or associated with 1-3 female flowers at base, greenish or greenish yellow; peduncles up to 3 cm long, fulvous hirsute; bracts spatulate-oblancheolate or lanceolate, 1.5-3 x 0.5-1 mm. *Male flowers:* pedicels c. 1 mm long, slender, glabrous; sepals 3, widely ovate to suborbicular, c. 1 x 0.7 mm, glabrous; stamens 3; filaments c. 0.3 mm long; anthers oblong, c. 0.3 mm long. *Female flowers:* pedicels c. 1 mm long, hirsute; sepals 6, 1-2 mm long, fimbriate, hispid, enlarging and stellately spreading in fruit; ovary subglobose, c. 2 mm in diameter, 3-lobed, fulvous hirsute; styles c. 3 mm long, united at base into a column, trifid at apex. *Capsules* depressed, 3-5 x 6-8 mm, deeply 3-lobed, light green, dark brown when dry, evanescently scattered tawny or fulvous hispid; seeds subglobose, 2-3 mm in diameter, yellowish, reddish brown mottled; fruiting sepals 6; main body of sepals linear to oblong, 3-6 x 2-4 mm (including lobes); lobes of sepals 4-10 per side, linear, 1-2 mm long, fulvous hispid or hirsute.

Flowering & Fruiting: Throughout the year.

Distribution: India, Sri Lanka, Africa.

Habitat: Waste places, coastal scrublands, sides of paddy fields, cultivated fields, thickets, hedges, up to 650 m., common.

Specimens Examined: INDIA, **Andhra Pradesh**, Cuddapah distr., Cuddapah, July 1885, Gamble 16378. Kurnool distr., Peepully, 12 Sept. 1984, R.R.V. Raju 3164. Nellore distr., Nandavaram, 24 July 1914, Ramaswamy 1163. Prakasam distr., R. R. tank, 3 July 1983, Mohan 16. Srikakulam distr., Salur, 11 Sept. 1962, Balakrishnan 1131. **Gujarat**, Rajkot, n. d., No collector s. n. (Acc. no. 418181). **Karnataka**, Mysore distr., Chamrajnagar railway station, 29 Apr. 1962, A.S. Rao 80445; N. Kanara distr., Kuput tuils, 3 Aug. 1888, Talbot 1673. **Madhya Pradesh**, Gwalior, Apr. 1889, Maines 75. Hoshangabad distr., Round about Hoshangabad, 28 Sept. 1960, Joseph 11051. **Maharashtra**, Without locality, n. d., Dalzell s. n. (Acc. no. 418200); Dhej, n. d., Dalzell s. n. (Acc. no. 418196); Hills Dharee near Kadakiasta, 27 July 1890, P.S.K. 172; Subargadga, 22 Aug. 1956, Gangurde 9954. **Penins. Ind. Or.**, Wight KD 2622. **Rajasthan**, Khanpur, 23

Dec. 1964, Verma 6960. **Travancore**, Without locality, n. d., Calder & Ramaswamy 718. **Tamil Nadu**, Coimbatore distr., Kuridimalai, 7 Nov. 1956, Subramanyam 1211 (all at CAL). N. Arcot distr., Without specific locality, 29 June 1963, Ramamurthy 16610; S. Arcot distr., Near Gomuki dam, 18 Jan. 1978, Ramamurthy 52826 (all at CAL, MH). Ramanathapuram distr., Tiruvadanai, 2 Jan. 1988, Balasubramanyam 1538 (CAL); Thanjavur distr., Tiruvarur to Nunniam, 16 Sept. 1977, Ramamurthy 51286 (CAL, MH). **West Bengal**, Midnapur distr., Midnapur, 1995, Bhattacharya s. n. (CAL). **SRI LANKA**, Without locality, n. d., No collector CP 3569 (CAL).

Tragia praetervisa Chakrab. et N.P. Balakr., *sp. nov.*

T. hispida sensu auct. plur., non Willd. 1805: Gamble, Fl. Pres. Madras 2(7): 1332. 1925; Alston in Trimen, Handb. Fl. Ceylon 6: 265. 1931; Ramamoorthy in Sald. & Nicols., Fl. Hassan Distr. 349. 1976; Deshpande et al., Fl. Malabaleshwar 2: 543, f. 55. 1995; Philcox in Dassan. & Clayton, Rev. Handb. Fl. Ceylon 11: 141. 1997; Londhe in N.P. Singh et al., Fl. Maharashtra State 2: 904. 2001.

T. involucrata auct. non L., 1753: Thw., Enum. Pl. Zeyl. 270. 1861, p. p., quoad CP 2100 et CP 2951; Dalz. & Gibs., Bombay Fl. 228. 1861, p. p.; Trimen, Handb. Fl. Ceylon 4: 61. 1898, p. p.

T. montana (Thw.) Müll.Arg. in Linnaea 34: 183. 1865 & in DC., Prodr. 15(2): 944. 1866, p. p., excl. typo, quoad CP 2100.

T. involucrata var. *cordata* sensu Trimen l. c. 62. 1898, p. p., excl. CP 3519, non Müll. Arg., 1866.

T. muelleriana var. *cordata* sensu Bennet, Fl. Howrah Distr. 210. 1976, non (Müll. Arg.) Pax & Hoffm., 1919.

T. muelleriana var. *unicolor* auct. non (Müll.Arg.) Pax & Hoffm., 1919: S.M. Almeida, Fl. Samantawadi 1: 395. 1990, p. p.; Londhe, l. c. 905. 2001, p. p. excl. syn.

T. montanae affinis, a qua tamen imprimis differt sepalis fructiferis linearibus vel anguste oblongis, instructis lobis marginalibus 4-8 binatim, linearibus vel anguste oblongis. *T. hispidae* affinis, a qua tamen imprimis differt foliis 2- vel 3-plo longioribus quam latioribus (3-18 x 1-8.5 cm), nec lanceolatis nec oblongo-lanceolatis, sed ovatis, cordato-ovatis, oblongo-ovatis vel oblongis, anguste oblongo-deltatis, ad marginem aequaliter serratis vel serrulatis, dentatis vel denticulatis, ad apicem caudatis vel caudato-acuminatis; nervis lateralibus craspedromis vel semicraspedromis.

Type: SRI LANKA, without locality, Thwaites CP 2100 (Holotype, Acc. no. 418160, CAL); *ibid.*, Thwaites CP 2100 (Isotype, Acc. no. 418161, CAL).

Related to *T. montana* (Thw.) Müll.Arg., from which it particularly differs in fruiting sepals being linear to narrowly oblong with 4-8 pairs of linear or narrowly oblong lobes per side. Also related to *T. hispida* Willd. from which it differs in leaves being 2-3 times longer than broad (3-18 x 1-8.5 cm), neither lanceolate nor lanceolate-oblong but ovate, cordate-ovate, ovate-oblong to oblong or oblong-elliptic to narrowly oblong-deltoid, evenly serrate to serrulate or dentate to denticulate along margins, caudate or caudate-acuminate at apex and the lateral nerves craspedromous to semicraspedromous.

Key to the varieties

- 1a. Plants monoecious; inflorescence bisexual var. **praetervisa**
 - 1b. Plants dioecious; inflorescence unisexual var. **unicolor**
- var. **praetervisa** Figs 2, 3

Herbs or herbaceous climbers, upto 5 m. high; young shoots fulvous tomentellous or scattered hirsute; stem and branches flattened, angled and striate towards apices, terete towards base, greenish, yellowish, brown to dark brown, 1-3 mm thick, scattered fulvous hirsute or hispid, glabrous by age. Leaves ovate, cordate-ovate, ovate-oblong to ovate-elliptic or oblong-elliptic to narrowly deltoid-oblong, 3-18 x 1-6.5 cm, cordate or narrowly so at base, serrate (to serrulate) or dentate (to denticulate) along margins, caudate or acuminate (cauda or acumen 5-15 mm long, acute) at apex, membranous to thinly chartaceous, scattered fulvous or grey hispid or

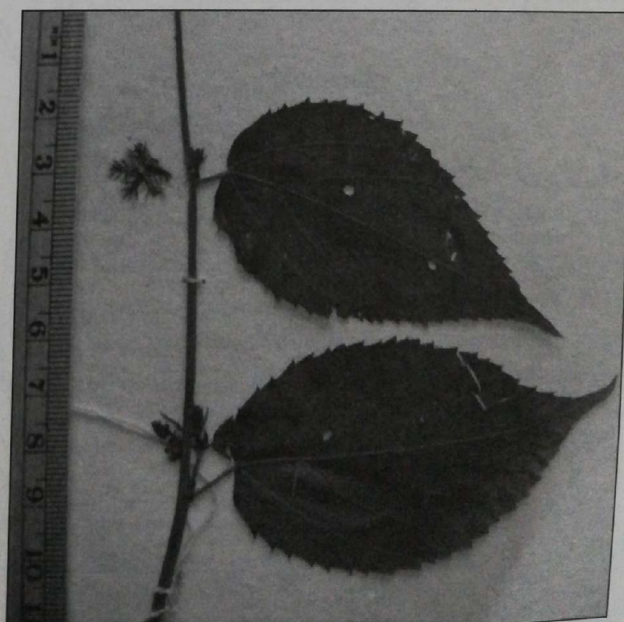


Figure 2. *Tragia praetervisa* Chakrab. & N.P. Balakr. var. *praetervisa*

hirsute above and beneath (mainly on nerves), green, brown to dark brown or often blackish above when dry, green to pale brown or coppery beneath, 3-nerved at base; lateral primary nerves slender,

extending 30-60 % way along the lamina; midrib slender, usually slightly raised above, raised beneath; lateral nerves slender, 3-6 per side above the basal, faint to prominent above, conspicuous beneath,

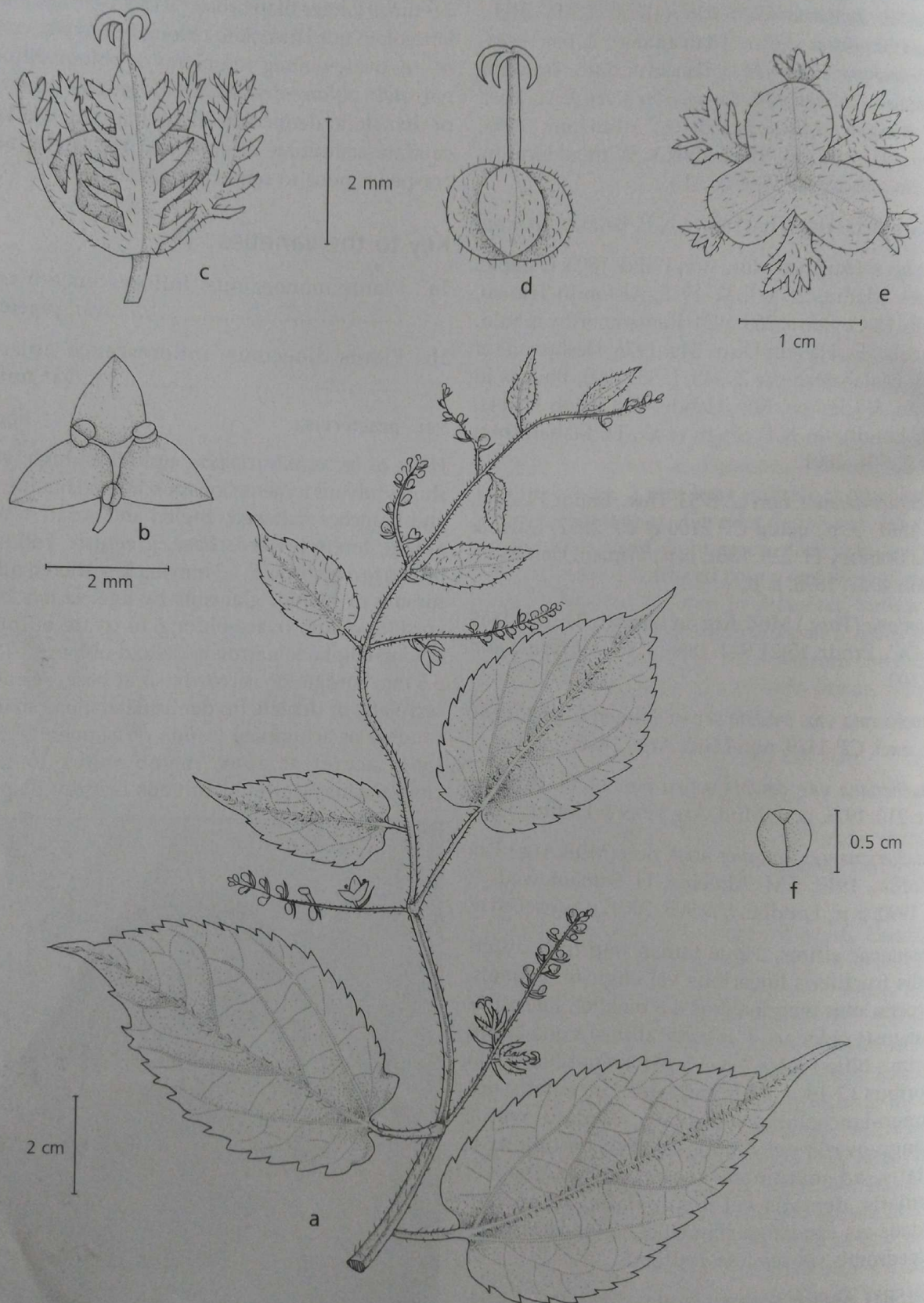


Figure 3. *Tragia praetervisa* Chakrab. et N.P.Balakr. - a. Habit; b. Male flower (top view); c. Female flower (side view); d. Ovary and Styles; e. Fruit (top view); f. Seed (from R.S. Rao 84330, A. Babu 38278)

ascending-arcuate, craspedromous to semicraspedromous; tertiary nerves obscure or faint above, faint to prominent beneath, scalariform or occasionally laxly reticulate; petioles 0.5-5 (-7.5) cm long, 0.7-2 mm thick, flattened, striate or terete, scattered fulvous hirsute, hispid or tomentellous, glabrescent in age; stipules subulate, up to 4 mm long, caducous. *Racemes* terminal or leaf-opposed, 3-12 cm long, with 1 or 2 female flowers at proximal nodes and several to many male flowers at distal nodes, greenish or greenish-white; peduncles 0.5-3 cm long, 0.6-1.2 mm thick towards base, scattered fulvous hirsute or hispid; bracts linear to lanceolate or ovate (in female), 1-3 mm long, glabrous. *Male flowers*: pedicels c. 1 mm long; sepals 3, ovate to suborbicular, c. 1.2 mm across; stamens 3; filaments thick, triangular, c. 0.4 mm long, slightly united at base; anthers wide oblong to suborbicular, c. 0.3 mm long/across. *Female flowers*: pedicels 0.5-1 mm long, glabrous; sepals 6, 2-5 x 1-3 mm, enlarging and stellately spreading in fruit; ovary subglobose, c. 2 mm in diameter, fulvous hirsute or hispid; style 1.5-2.5 mm long, erect, connate below into a column, trifid and recurved at apex. *Capsules* depressed, c. 3 x 8 mm, deeply 3-lobed, yellowish green, brown when dry, scattered fulvous hispid; seeds globose, c. 4 mm in diameter, greyish and mottled brown; fruiting sepals 5-10 x 2-5 mm (including lobes); main body of sepals linear to narrowly oblong or occasionally spatulate or narrowly ovate-oblong, scattered fulvous puberulous or hispid to glabrous outside, glabrous inside; lobes of sepals 4-8 per side, linear to narrow oblong, 1.5-3 (-5) mm long, often arching, densely fulvous hispid.

Flowering & Fruiting: Throughout the year but peak in August - February.

Distribution: India, Sri Lanka.

Habitat: Open and semievergreen forests; along roadsides on clayey soil up to 1400 m., common; rare in West Bengal and Mizoram.

Specimens Examined (all paratypes): INDIA, **Goa**, Along road after entering Goa, 5 Nov. 1962, R.S. Rao 84330; Budsari, Goundugarha, 10 Nov. 1962, R.S. Rao 84582; Verna village plateau, 19 Aug. 1963, Kanodia 89339. **Karnataka**, Coorg distr., Madapur - Sulalooi road, 9 Oct. 1961, No collector 75011 (all at CAL). **Kerala**, Cannanore distr., Kumbala, 25 Jan. 1979, Ramachandran 59234 (CAL, MH); ibid., 25 Jan. 1979, V.J. Nair 59882 (all at CAL, MH). **Malappuram** distr., Nilambur, 6 Dec. 1985, A. Babu 38278. **Maharashtra**, Without locality, n. d., No collector s. n. (Acc. no. 418165). **Pune** distr., Panchgani, 27 Apr. 1957, G.S. Puri 14435; Pandogar hill, Ambavne, 14 m. s. south of Lonavla, 20 Dec.

1963, B.V. Reddi 93164; Thangaon, 15 Feb. 1958, Mahajan 32079; Sakrapathan near 6/3 m. p. from Lonavla to Ambavne - Pune road, 1 Dec. 1963, B.V. Reddi 68366; Thane distr., Sadrya ghat, Takanada range, 15 Nov. 1968, Billore 115477; Ludwig point, 28 Dec. 1950, Bole 145; Mahabaleswar holiday camp, 11 Oct. 1957, Mahajan 27151; Mahad Ghat, 28 Apr. 1957, G.S. Puri 16719; Merrra Dongr, n. d., Dalzell s. n. (Acc. no. 418210, all at CAL). **Tamil Nadu**, Kanniyakumari distr., Right fland saddle No. 3, Selvam Koopu, Upper Kodayar, 17 Feb. 1983, Henry 77040 (CAL, MH). **Travancore**, Without precise locality, n. d., Narayanaswamy 847 (CAL); Thorai, 29 Aug. 1913, Calder & Ramaswamy 353. **Mizoram**, Lushai hills, 23 Nov. 1902, J.E. Leslie 35. **West Bengal**, Howrah distr., Kulgachia, 22 May 1963, Bennet 282 (all at CAL).

var. **unicolor** (Müll.Arg.) Chakrab. et N.P. Balakr., *comb. nov.*

T. miqueliana Müll. Arg. var. *unicolor* Müll. Arg. in DC., Prodr. 15(2): 943. 1866.

Type: India, Malabar & Concan, Stocks s. n. (K, photo!).

T. muelleriana Pax & Hoffm. var. *unicolor* (Müll. Arg.) Pax & Hoffm. in Engler, Pflanzenr. IV.147.ix-xi (heft 68): 81. 1919.

Distinguished from var. *praetervisa* in the plants being dioecious and the inflorescences unisexual.

Herbaceous climbers. *Male*: racemes leaf-opposed, 4-6 cm long with many flowers; peduncles 1-2 cm long, c. 0.9 mm thick towards base, densely fulvous hirtellous. *Female*: racemes 2-3 cm long with 2-3 solitary flowers at each node; sepals 6, c. 5 x 2.5 mm; main body linear, glabrous on both surfaces; lobes 4-6 per side, linear, 2-3 mm long, densely fulvous hispid.

Flowering: October - November.

Distribution: India, endemic.

Specimen Examined: INDIA, **Karnataka**, Coorg distr.: Karwar, Oct. 1929, Sedgwick & Bell 6702 (CAL).

Tragia sanjappae Chakrab. et N.P. Balakr., *sp. nov.*

Tragia involucrata var. *angustifolia* Hook.f., Fl. Brit. India 5: 465. 1888; Gamble, Fl. Pres. Madras 2(7): 1332. 1925; Chandrabose in Henry et al., Fl. Tamil Nadu, Ser. I. Analysis, 2: 240. 1987; Narasimhan et al. in J. Econ. Taxon. Bot. 13: 57, f. 2. 1989. **Fig. 4**

Species haec ab *Tragia involucratae* L. differt foliis 6-12-plo longioribus quam latioribus, 7-15 cm longis, 0.6-2 cm latis, ad marginem irregulariter et remotis serrulatis ad apicem attenuatis vel caudatis, penninerviis, leniter trinerviis ad bases, nervis basibus lateralibus extensis 10-30 % sursum

laminarum; nervaturis secundariis plerumque brochidodromis, nervis lateralibus 7-15 binatis supra nervos basales, lobis calycibus fructiferis brevissimis (0.3-2 mm longis).

Type: Tamil Nadu, Coimbatore distr., Aliya submergible area, 24 Nov. 1962, K.M. Sebastine 15370 (Holotype, CAL; Isotype, MH).

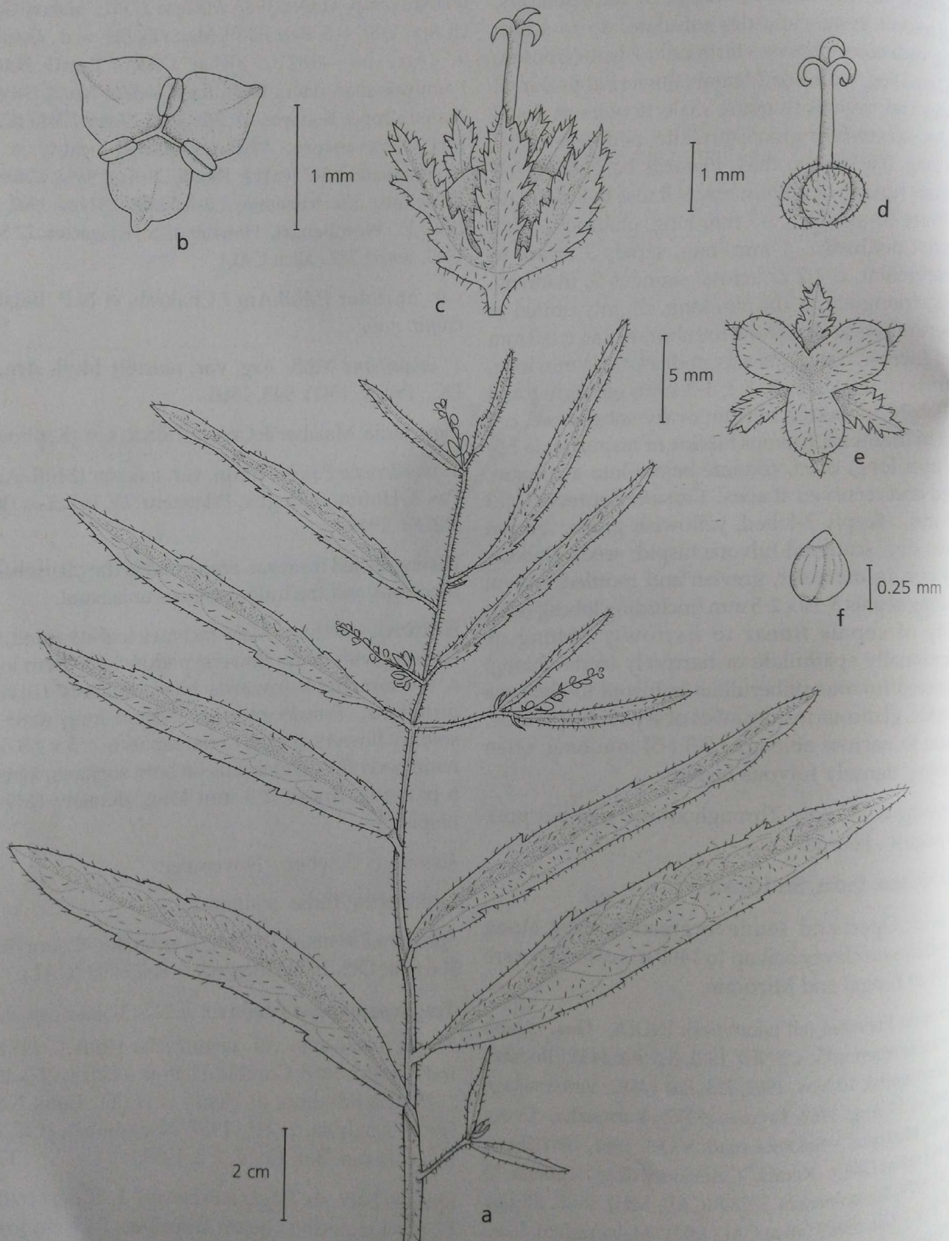


Figure 4. *Tragia sanjappae* Chakrab. et N.P.Balacr. - a. Habit; b. Male flower (top view); c. Female flower (side view); d. Ovary and Styles; e. Fruit (top view); f. Seed (from K.M. Sebastine 15370)

Allied to *Tragia involucrata* L. but differing in leaves being 6-12 times longer than broad, 4-20 cm long, 0.4-2.6 cm wide, irregularly and distantly serrulate to entire along margins, attenuate or attenuate-caudate at apex, penninerved or very weakly trinerved at base with the basal lateral nerves extending 10-30 % way up the lamina; secondary venation mostly brochidodromous; lateral nerves 7-15 pairs above the basal nerves; fruiting calyx lobes very small (0.3-2 mm long).

Climbing herbs, c. 75 cm high; stem and branches flattened and striate towards apices, terete to semiterete towards base, 1-4 mm thick, tawny or brown hispid when young, glabrous in age. *Leaves* narrowly oblong-lanceolate to linear-oblong, 4-20 x 0.4-2.5 cm, narrowly cuneate to cuneate-attenuate at base and obscurely contracted cordate at extreme base, irregularly and distantly serrulate to entire along margins, attenuate to attenuate-caudate (cauda 10-30 mm long) at apex, chartaceous, scattered brownish or tawny hispid or hirsute above and on nerves beneath, green to pale brown above and beneath on drying, penninerved or very weakly trinerved at base with the basal pair of lateral nerves extending 10-30 % way along the lamina; midrib slightly raised above, raised beneath; upper lateral nerves 7-15 per side, slender, arching, faint above, more or less prominent beneath, predominantly brochidodromous; tertiary nerves inconspicuous above, faint to prominent beneath, scalariform or laxly reticulate at some portions; petioles 3-35 x 0.7-1.5 mm, striate, brown hispid or hirsute; stipules lanceolate, 2-3 mm long. *Racemes* axillary, terminal or leaf-opposed, up to 2 cm long, with 1-2 female flowers at lower nodes and several male flowers at upper nodes; peduncle up to 1 cm long, c. 0.6 mm thick towards base, fulvous hispid; bracts spatulate to oblanceolate, 1.5-2 x 0.5-0.8 mm. *Male flowers*: pedicels up to 2 mm long, glabrous; sepals 3, suborbicular, c. 1 x 0.7 mm; stamens 3; filaments c. 0.5 mm long, dilated and connate at base; anthers broadly oblong, c. 0.4 mm long. *Female flowers*: subsessile or with up to 1 mm long pedicels; sepals 6, linear, c. 3 x 1 mm, pinnatifid, accrescent and stellately spreading in fruit; ovary subglobose, c. 1.5 mm across, ochraceous hispid; style 3-4 mm long, connate at base into a column, trifid and recurved at apex. *Capsules* subsessile, depressed, deeply 3-lobed, 3-4 x 8-10 mm, brown when dry, scattered ochraceous hispid; seeds subglobose, c. 4 x 3 mm, greyish brown and mottled brown; fruiting sepals 4-6 x 1-3 mm (including lobes); main body linear, fulvous/white hispid outside, glabrous inside; lobes

5-8 per side, linear or subulate, 0.3-2 mm long, hispid or hirsute.

Flowering & Fruiting: September - January.

Distribution: India (Andhra Pradesh, Kerala, Tamil Nadu), endemic.

Habitat: Semievergreen forests between 65 - 1300 m., rare.

Specimens Examined (all paratypes): INDIA, **Andhra Pradesh**, E. Godavari distr., Near Boddalanka, 8 Aug. 1987, D. Narasimhan 85558 (MH). Rampa distr., Palakonda, 1 Oct. 1920, Naranayaswamy 378 (CAL). **Kerala**, Kottayam distr., Kottayam, 8 Jan. 1954, Moos 96253 (MH). **Tamil Nadu**, Anna distr., Kodaikanal ghat, 1 Jan. 1899, Bourne 2871 (CAL, MH); Lower Pulneys, n. d., van Malderen 1367 (CAL). Coimbatore distr., Deddesal 19 Nov. 1905, C.E.C. Fischer 127 a (CAL); Thekkankadu, Chothankadu, 23 Aug. 1929, Narayanaswamy 19198 (MH). **Penins. Ind. Or.**, n. d., Wight KD 2623 (CAL); 1866-68, Wight 2623 (det. J. S. Gamble); Herb. Ind. Or. Hooker f. & Thomson, Hab. Maisor & Carnatic, coll. G. Thomson s. n. (det. J. S. Gamble) (3 sheets); Pulney hills, Kodaikanal, 11 Dec. 1898, Bourne s. n. (det. J. S. Gamble); Pulney, Kodaikanal, Bourne 2871 (2 sheets); Dindigul distr., Kodaikanal, 1000 m, 25 Aug. 1986, K.M. Mathew 46683 (det. A.R. Smith on 9 July 1991) (all at K)

Note: Pax & Hoffmann (in Engler, Pflanzennr. IV.147.ix-xi(heft 68): 79. 1919) followed by Bennet (Fl. Howrah Distr. 210. 1979) combined *T. involucrata* var. *angustifolia* with *T. hispida* Willd. On the other hand, Gamble (1925), Chandrabose (1987) and Narasimhan et al. (1989) continued to consider it as a distinct variety of *T. involucrata*. The one line diagnosis of J.D. Hooker (1888) "leaves narrowly linear or oblong-lanceolate base contracted cordate" is clear enough to identify the variety. However, he had not cited any specimen, nor is there any indication of its localities. Reference to the specimens in CAL and K showed that none of the specimens marked as var. *angustifolia* bore any annotation by J.D. Hooker. Therefore, it becomes impossible to typify this variety. Study of the specimens indicated that they were morphologically distinct from *T. involucrata*. Hence it is described here as a new species.

The specific epithet is in honour of Dr M. Sanjappa, Director, Botanical Survey of India.

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